

BITTERBRUSH

Purshia tridentata

Pursh (DC)

Plant symbol = PUTR2

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Alternate Names

Antelope bitterbrush, antelope-brush, quinine brush, black sage, deer-brush, greasewood, buckbrush

Key Web Sites

Extensive information about this species is linked to plants.usda.gov--PLANTS web site. To access this information, go to the PLANTS web site, select this plant, and utilize the links at the bottom of the Plants Profile for this species.

Uses

Bitterbrush is recommended for restoring depleted rangelands, burned areas, mined lands, and other distributed sites in the Intermountain West. It is mainly valuable for improving forage production and quality for big game on fall and winter ranges. Material available commercially has been selected for seedling vigor, productivity, upright growth form, palatability, forage availability, seed production and retention of over-wintering leaves.

Historic Native American Uses: Western Indian groups used leaf poultice or wash for itches, rashes, insect bites, chickenpox, and measles. Leaf tea was used as a general tonic and for colds, pneumonia, liver disease, to expel worms, and as an emetic and laxative for stomach ache and constipation. Twigs, leaves, and berries were used as a laxative. Root teas

were used for coughs, lung and bronchial infections, fever, and to facilitate delivery of placenta.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description

General: Rose Family (Rosaceae). Mature plants are large, leafy perennial shrubs with few basal stems. They have spreading crowns, heavy lateral spur production, and long ascending leaders. The average height is 8 feet with a 10-foot crown. Floral and vegetative morphology is typical for bitterbrush, with little introgression from Stansbury cliffrose (*Purshia stansburiana*), an unpalatable related species native to the Southwest.

Flowers are small, varying from white to yellow, and produced profusely along each leader. The seeds are large for the species—15,500 per pound. They are about one-fourth inch long and obovate. Seeds, stems, and leaves are nontoxic.

Individual bitterbrush plants exhibit considerable variation for growth form. Bitterbrush's growth forms vary from a uniform, erect growth habit to more decumbent, layering forms. Users are encouraged to consider the various forms of bitterbrush in choosing a strain best suited to their needs.

Distribution: Bitterbrush is found in the intermountain west including Arizona, British Columbia, California, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming. Bitterbrush does not occur west of the Cascade Mountains in the northwest United States. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation

Bitterbrush is associated with big sagebrush (*Artemisia tridentata*) and rabbitbrush (*Chrysothamnus* sp.). It occurs naturally on dry lake beds, alluvial fans or terraces, and low foothills. It occurs in soils that are deep, gravelly, loamy coarse sands derived from granite, with pH ranging from 6.0 to 7.0.

Tests have shown that bitterbrush has high potential for use on deep, coarse, well-drained, neutral to slightly acidic soils in areas that have 12-24 inches of annual precipitation. It is not well-adapted to basic, fine-textured, or poorly drained soils. Bitterbrush has performed well at sites in eastern Oregon, central and southern Idaho, northern California, and western Nevada at elevations of 3,000 to 6,000 feet. It performs best on sites that support bitterbrush-grass, basin big sagebrush-grass, mountain brush, and ponderosa pine-bitterbrush plant communities.

Bitterbrush has also performed adequately in Utah. Another strain, however, is being developed for the eastern part of the area of adaptation and a layering form for very sandy sites that are subject to blowing.

Establishment

On rangeland sites, bitterbrush should be seeded in late fall or winter to permit field stratification. Pretreatment with hydrogen peroxide is required to break dormancy for spring seeding. Seedlings are susceptible to late frosts. Plants develop very slowly and must be protected from competition during the first two seasons. Recommended seeding rates are 1 to 3 pounds of pure live seed per acre. Bitterbrush seedlings are often transplanted on critical sites. In such cases, moisture must be adequate to ensure survival in the first year. One-year-old bare-root or containerized seedling stock, 6 to 24 inches tall, is recommended.

Several insects and diseases are known to damage the foliage, seed, and seedlings of bitterbrush, and are more or less susceptible than other species. High-density populations of grasshoppers can destroy seedlings.

Management

Bitterbrush is used by big game and livestock during all seasons and remains productive despite heavy browsing. Stand conditions generally deteriorate, however, when annual use exceeds 60 percent of the annual growth. Bitterbrush is not fire-tolerant and resprouts only infrequently following burning.

Pests and Potential Problems

A number of insects and diseases are known to damage the foliage, seed, and seedlings of bitterbrush. Individual plants growing in uniform garden plots of bitterbrush have not been observed to be more susceptible to damage by insects or diseases than other accessions of the species. Grasshoppers in high densities have damaged or destroyed seedlings.

A beneficial organism associated with antelope bitterbrush is the nitrogen-fixing endophyte *Frankia purshiae*.

Seeds and Plant Production

Mature seed must be harvested with 3 to 10 days of ripening because it shatters quickly after reaching maturity. Seed may be harvested into canvas hoppers or aluminum seed collection trays positioned under the shrubs prior to seed fall. Seed collection and orchard maintenance are simplified by the upright growth form.

A 3.6 to 3.6 m to 4.9 x 4.9 m (12 x 12 ft to 16 x 16 ft) spacing is recommended for antelope bitterbrush seed orchards. Plants in wildland stands reach full seed production in 8 to 20 years. With appropriate cultural practices, this period may be reduced to about 5 years for seed orchards. Nine-year old shrubs grown at 2.4 m (8 ft) spacings without irrigation or other cultural treatments at the Boise Shrub Garden, produced 118 g (0.26 lbs) of seed per shrub or 199 kg/ha (177 lbs/acre).

Seed is easily cleaned to a purity of 95 percent using a two-screen fanning mill and a barley debearder. Shriveled black seed is nonviable and should be separated with the chaff. Seeds of bitterbrush are relatively large, averaging 34,507 seeds/kg (15,685 seeds/lb) for cleaned seed, with germination averaging about 84 percent. Seeds of bitterbrush remain viable for 15 years or more in open storage.

On rangeland sites antelope bitterbrush is normally seeded in late fall or winter to permit field stratification of the seed. Pretreatment with hydrogen peroxide is required to break dormancy for spring seeding. Seedlings are susceptible to late frosts. Plants develop very slowly and must be protected from competition during the first two seasons. Recommended seeding rates are 1.2 to 3.3 kg/ha (1 to 3 lbs/acre). Bitterbrush may be established on critical sites by transplanting.

Cultivars, Improved, and Selected Materials (and area of origin)

'Lassen' Cultivar- Lassen originates from seed collected from native stands near Janesville in Lassen County, California. This is a representative ecotype derived from a geographic area that lies in a narrow, 50-mile strip at the base of the eastern side of the Sierra Nevada Mountains from Susanville to Doyle, California.

'Maybell Source'-Maybell is found in the Northwest

portion of Moffat County, Colorado.

References

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Foster, Steven and Christopher Hobbs. 2002. *Western Medicinal Plants and Herbs*. Houghton Mifflin Company, New York, New York. 296-7 p.

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